

Multijunction Ultralight Solar Cells and Arrays, Phase I

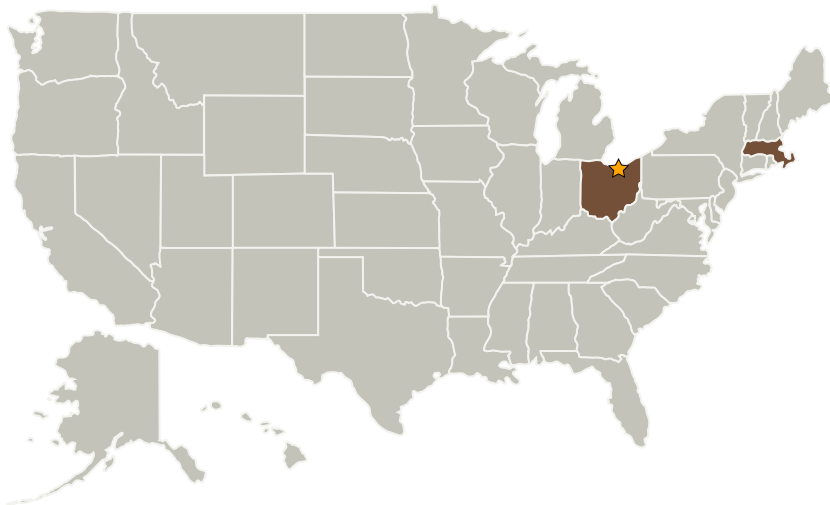
Completed Technology Project (2004 - 2005)



Project Introduction

There is a continuing need within NASA for solar cells and arrays with very high specific power densities (1000-5000 kW/kg) for generating power in a new generation of ultralight space payloads. An emerging technology with promise to meet these ambitious goals are solar cells based on very thin films of discrete layers or interpenetrating networks (IPNs) of organic donors and acceptors. It is also recognized in the field of thin film inorganic solar cells, that it is possible to stack cells tuned to the blue, green and red portions of the solar spectrum, thus harvesting photons with less degradation of their energy. Theoretical efficiencies for multijunction solar cells are ~70% compared to ~30% for single junction devices. Indeed, these multijunction solar cells hold the current record for solar conversion efficiency. In this proposed joint STTR program between EIC Laboratories and the University of Florida, we will develop multijunction organic donor-acceptor solar cells as a means to achieve higher efficiencies than can be realized with single junction devices. Phase I will demonstrate feasibility using a two junction blue-red device. Phase II will develop three junction devices and scaled up devices on lightweight flexible polymer substrates.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
EIC Laboratories, Inc.	Supporting Organization	Industry	Norwood, Massachusetts

Primary U.S. Work Locations

Massachusetts	Ohio
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Krishna Mandal

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.1 Photovoltaic